REMARKS

Status

Claims 1-9, 11-24, 26 and 31 are at issue in the Office Action. Claims 26 and 31are at issue in the Office Action. Claims 26 and 31 were indicated as allowed and claims 1-9 and 11-24 were rejected. This response does not add or delete any claims, and it is claims 1-9, 11-24, 26 and 31 which are presently at issue.

The Office Action

In the Office Action mailed September 9, 2005, claims 1-8 and 11-23 were rejected under 35 U.S.C. §102, as being anticipated by U.S. Patent 6,544,687 of Sato or under the corresponding PCT application of Sato, WO/01/03210. In addition, claims 1, 3-5, 7-9, 11, 13 and 17-24 were rejected under 35 U.S.C. §102, as being anticipated by U.S. Patent 6,824,921 of Sato.

The Examiner has indicated that claims 26 and 31 are allowed.

Applicant thanks the Examiner for the withdrawal of certain previously made rejections, the indication of allowable subject matter, and the thorough explanation of the basis of the present rejections.

The Rejection Based Upon U.S. Patent 6,544,687 and PCT No. WO/01/03210

Claims 1-8 and 11-23 were rejected under 35 U.S.C. §102, in view of the '687 patent or in view of the corresponding PCT publication.

The '687 patent and its corresponding PCT application show a lithium battery having a negative electrode material comprised of a solid solution of various metals and/or silicon.

Applicant previously argued that the '687 patent is not relevant to the presently claimed invention since it does not show the presently claimed material. Claims of the present application all include the limitations that the material is (1) a multiphase composite having (2) a first, active

phase which is an amorphous electrochemically-active material, and (3) a second, stabilizer phase comprised of a particular group of materials and configured as (4) spaced-apart regions having a size in the range of 10-100 nanometers.

The Examiner has restated the previous rejection, and has traversed the Applicant's arguments. It is the Examiner's position, as stated in the section of the Office Action termed "Response to Arguments," that the material of the '687 patent is an amorphous material. This is in contrast to arguments raised by the Applicants in the previous response. In this regard, the Examiner specifically cites column 5, line 33, column 5, lines 38-42 and the ERD data of Figure 3 of the '687 patent in support of this position.

Applicants respectfully submit that the Examiner's interpretation of the '687 patent is in error, and the cited two passages make very clear that the material in the '687 patent is crystalline and not amorphous. The cited passage commencing in column 5 describes the preparation of the materials of examples 1-45 summarized in Table 1. The passage describes, at column 5, line 35, preparation of the material involves a ball milling process wherein the solid solution material is reduced in particle size, and describes that "the average crystal grain size of any of the solid solutions calculated from an X-ray diffraction pattern was between 0.05 and 0.13 microns." This makes clear that the '687 patent acknowledges that the active material utilized therein is (1) a solid solution and not a composite and (2) is comprised of crystalline particles. The following paragraph commencing at line 38 further confirms this fact. The paragraph comments:

> "Among the obtained **solid solutions**, the X-ray diffraction pattern of Fe_2Sn is shown in Figure 3. Figure 3 shows that Fe_2Sn has **a single solid solution phase and no peak attributable to Fe and Sn is present**." (emphasis added)

This makes clear that the material is not a multiphase composite, but a single material. Furthermore, reference to Figure 3 shows that the X-ray diffraction pattern includes one very sharp peak corresponding to the Fe_2Sn solid solution, thereby confirming that this material is not a composite and that it is not amorphous, despite the Examiner's assertion. This paragraph goes on to read at lines 44 and following:

> "Sn atoms were infiltrated in the **crystal structure** of Fe, which is a body centered cubic (bcc) structure, but that the bcc structure was maintained. If it is supposed that all of the Sn atoms in the Fe_2Sn are infiltrated into the crystal structure of Fe and that the bcc structures maintain the position of a peak attributable to its (100) crystal phase as calculated to be 43 degrees. This value agrees with the actual measurements obtained from Figure 3. This also indicates that Fe_2Sn in the example is a solid solution where Sn is infiltrated into the crystal structure of Fe. (Emphasis added)

This passage makes very clear that the material of '687 patent is, in fact, comprised of crystalline particles of a solid solution having a uniform composition. It is in no way a multiphase material and in no way does it include an amorphous component. If the material were amorphous, the X-ray dispersion data of Figure 3 would not include a sharp peak, but would demonstrate a broad peak. In fact, it is very notable that the '687 patent nowhere uses the word "amorphous;" but, does utilize the words "crystal" or "crystalline" at least 27 times. Clearly, the '687 patent is directed to a crystalline material, and this fact is supported by the language and figures specifically pointed to by the Examiner.

In conclusion, the '687 patent, as well as its corresponding PCT application, does not show or suggest the presently claimed material since it does not show a material which is (1) a multiphase nanocomposite (2) having an amorphous, electrochemically active material and (3) a stabilizing material nano dispersed therein in (4) a size range of 10-100 micron. In view thereof,

Applicants respectfully request that the Examiner reconsider and withdraw this rejection; or alternatively, point to particular language which supports any contrary interpretation.

The Rejection Based Upon U.S. 6,824,921 of Sato

Claims 1, 3-5, 7-9, 11, 13 and 17-24 were rejected under 35 U.S.C. §102, as being anticipated by the '921 patent of Sato. The Sato '921 patent shows a negative electrode material for use in a lithium ion battery. The material of the '921 patent is prepared by a reactive ball milling process wherein an intermetallic compound, having one component which is easily nitrided and another which is not, is reactively processed to produce a particular, electrochemically active material having a nitrided component therein. It is the Examiner's position that this material meets the limitations of the presently pending claims. Applicants respectfully submit that such is not the case.

As detailed in the '921 patent, particularly in the passage commencing at column 9 describing examples 2-5, the material thereof is comprised of a plurality of phases of electrochemically active materials. Applicants concede that some of the phases of material in the '921 patent may be amorphous; however, the '921 patent does not show a multiphase nanocomposite material in which amorphous, electrochemically active material has nanophase domains of a stabilizer material dispersed therethrough.

In the Office Action, the Examiner cites to the X-ray diffraction data of Figure 3 of the '921 patent, as well as examples 1-5 to assert that the material therein is amorphous. The Figure 3 X-ray diffraction data does show successive loss in crystallitity as a crystalline intermetallic Ti_2Sn compound is reactively ball milled in a nitriding atmosphere. It is notable that the sharp crystalline peaks of the intermetallic material broaden and disappear as processing progresses, indicating that an increasingly amorphous material is being prepared (as an aside, Applicants wishes to contrast the Figure 3 data of the '921 patent with the Figure 3 data of the '687 patent,

and in that regard, supports Applicants' position that the '687 patent, and in particular, the Figure 3 data thereof, demonstrate that the material of the '687 patent is crystalline).

What is not shown in the '921 patent is any material which is comprised of an amorphous electrochemically active material with nano dispersed domains of a stabilizing material therein. The material of the '921 patent is a mixture of a number of different phases formed by ball milling particles and there is no data demonstrating or suggesting that it is any type of nanocomposite material, and none of the phases or components thereof are described as being, or functioning as, stabilizing phases. Therefore, the '921 patent does not show or suggest the presently claimed invention. In fact, all teaching therein is of structures very different from those at issue. Applicants respectfully request that the Examiner reconsider and withdraw this rejection or, alternatively, point to particular language in the '921 patent which supports the Patent Office's position.

Conclusion

For the following reasons set-forth above, Applicants respectfully submits that neither the '687 patent (or its PCT equivalent), not the '921 patent show or suggest the claimed materials of the present invention. These being the only basis for the rejection of the claims at issue, Applicants clearly submit that the application is now in condition for allowance.

Any questions, comments or suggestions the Examiner may have which would place the application in still better condition for allowance should be directed to the undersigned attorney.

Respectfully submitted,

Ronald W. Citkowski
Registration No. 31,005
Gifford, Krass, Groh, Sprinkle,
Anderson & Citkowski, P.C.
2701 Troy Center Drive, Suite 330
P.O. Box 7021
Troy, MI 48007-7021
(248) 647-6000

Attorney for Applicant

RWC/aka

CERTIFICATE OF MAILING BY "EXPRESS MAIL"

"EXPRESS MAIL" MAILING LABEL NUMBER EV669541903US

DATE OF DEPOSIT December 19, 2005

I hereby certify that this paper or fee (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service "Express Mail Post Office To Addressee" Service under 37 CFR 1.10 on the date indicated above and is addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Janice Burkhardt

Janice Burkhardt